



AMS-02 Thermal CDR

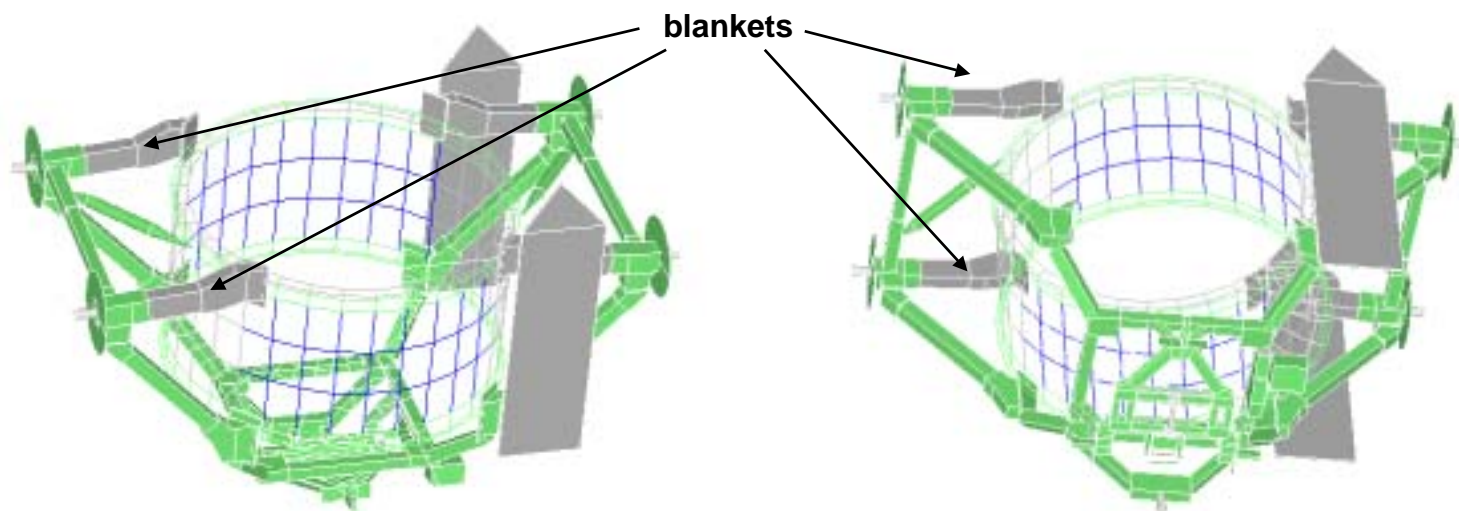
Vacuum Case

USS-02

ACC

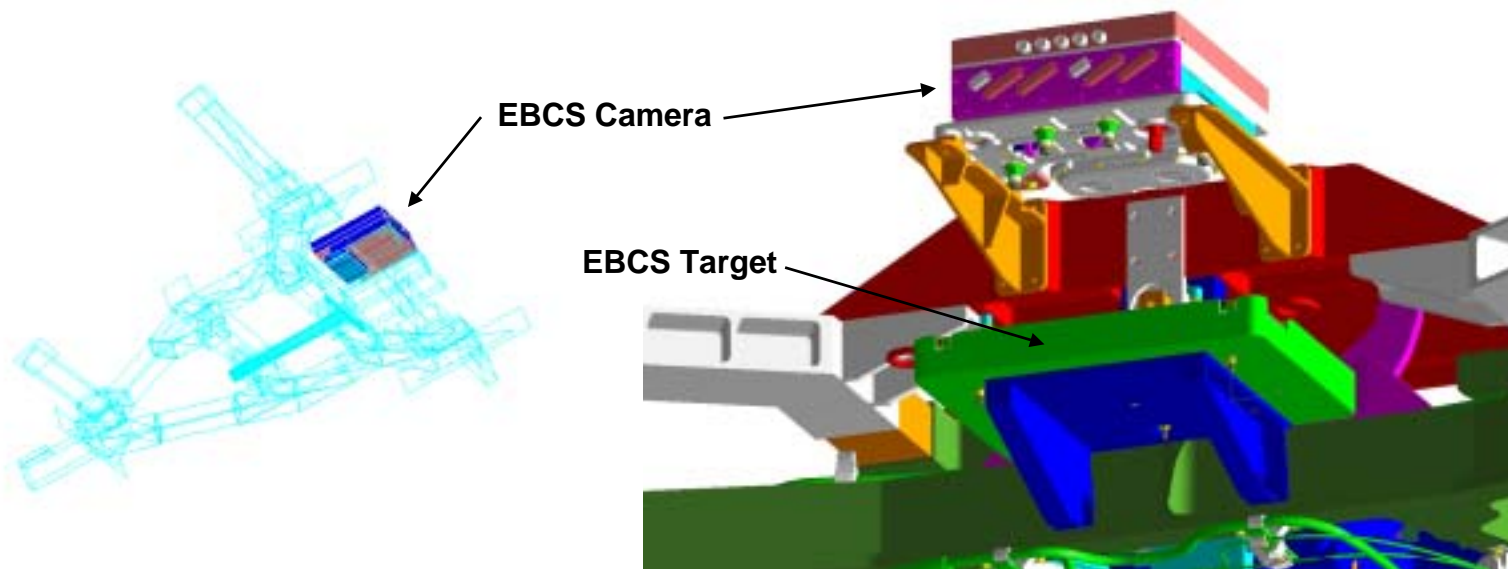
USS-02

- No heat dissipation
- Primarily anodized aluminum
- Provides structural interface to ISS, STS and AMS-02 sub-detectors
- Thermal blankets on joints and trunnion bridges are being considered to help reduce gradients at TRD I/F's.

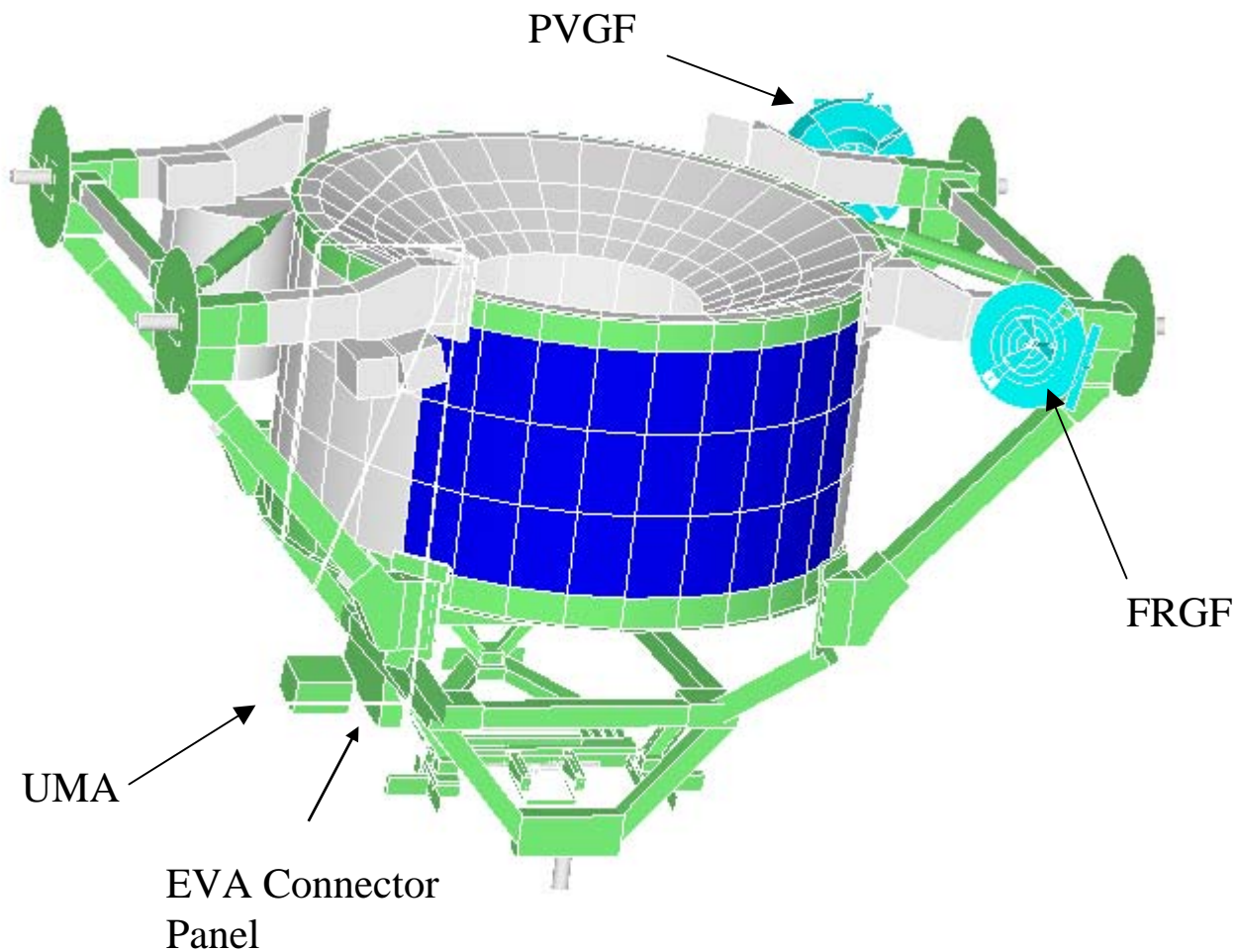


INTEGRATION HARDWARE

- **Unpowered Hardware: Power & Video Grapple Fixture (PVGF), Flight Releasable Grapple Fixture (FRGF), Umbilical Mechanism Assembly (UMA), Payload Disconnect Assembly (PDA), and EVA Connector Panel**
- **External Berthing Camera System (EBCS) will be used to berth (and unberth) AMS-02. Camera will be power “on”, whenever payload is grappled by the PVGF. Survival heaters will be activated constantly while AMS is powered through the UMA.**



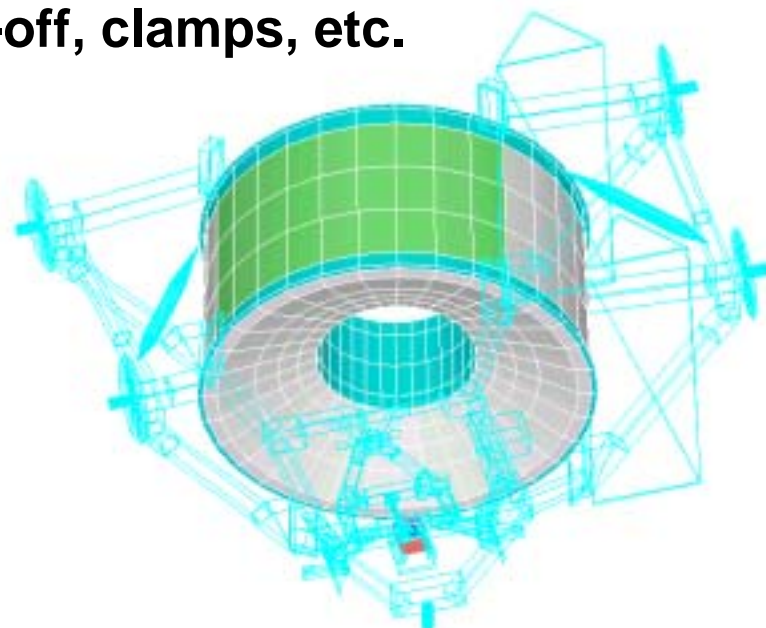
INTEGRATION HARDWARE (continued)





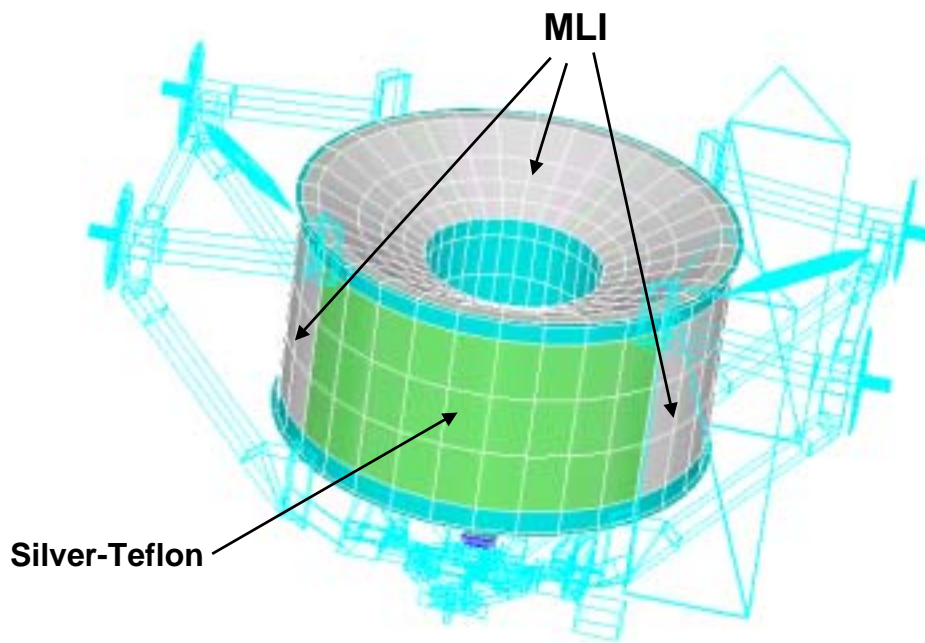
VACUUM CASE

- VC needs to be “cold as possible” to maximize SFHe endurance
- Any hardware mounted to VC with significant heat dissipation will be thermally isolated. Hardware mounted to VC include:
 - Cryo-coolers
 - Anti-Coincidence Counter (ACC) Photo Multipliers (PM's)
 - Tracker Thermal Control System (TTCS)
 - Tracker Cables
 - Miscellaneous cables, stand-off, clamps, etc.



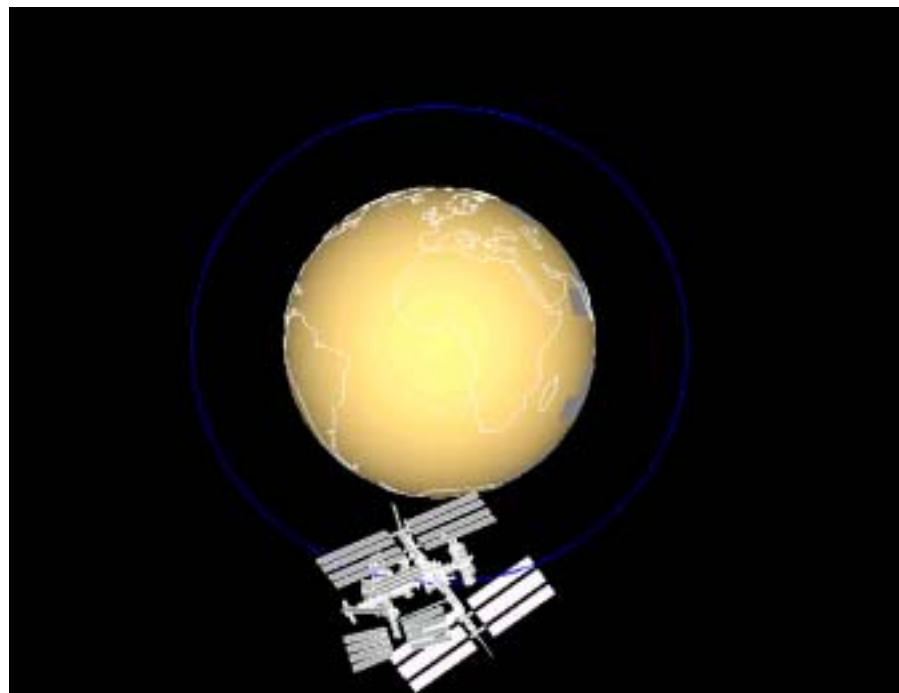
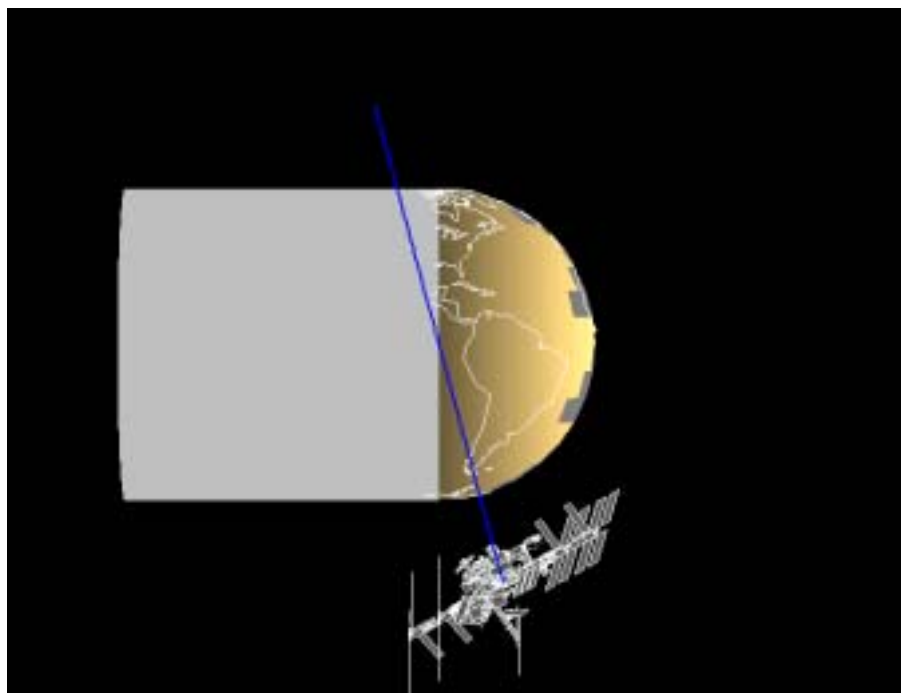
VACUUM CASE (continued)

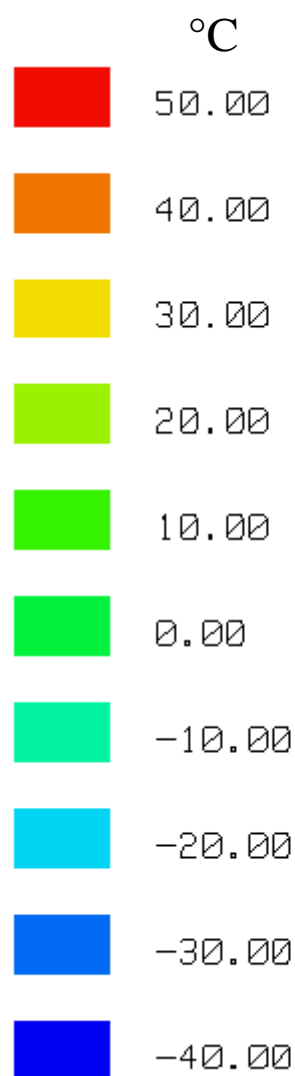
- Structural interfaces to USS-02, Tracker and ACC will also be thermally isolated.
- The VC will be covered with MLI blankets on +/- Y quadrants and silver-Teflon on +/-X quadrants. MLI blankets will also cover upper and lower conical flanges.



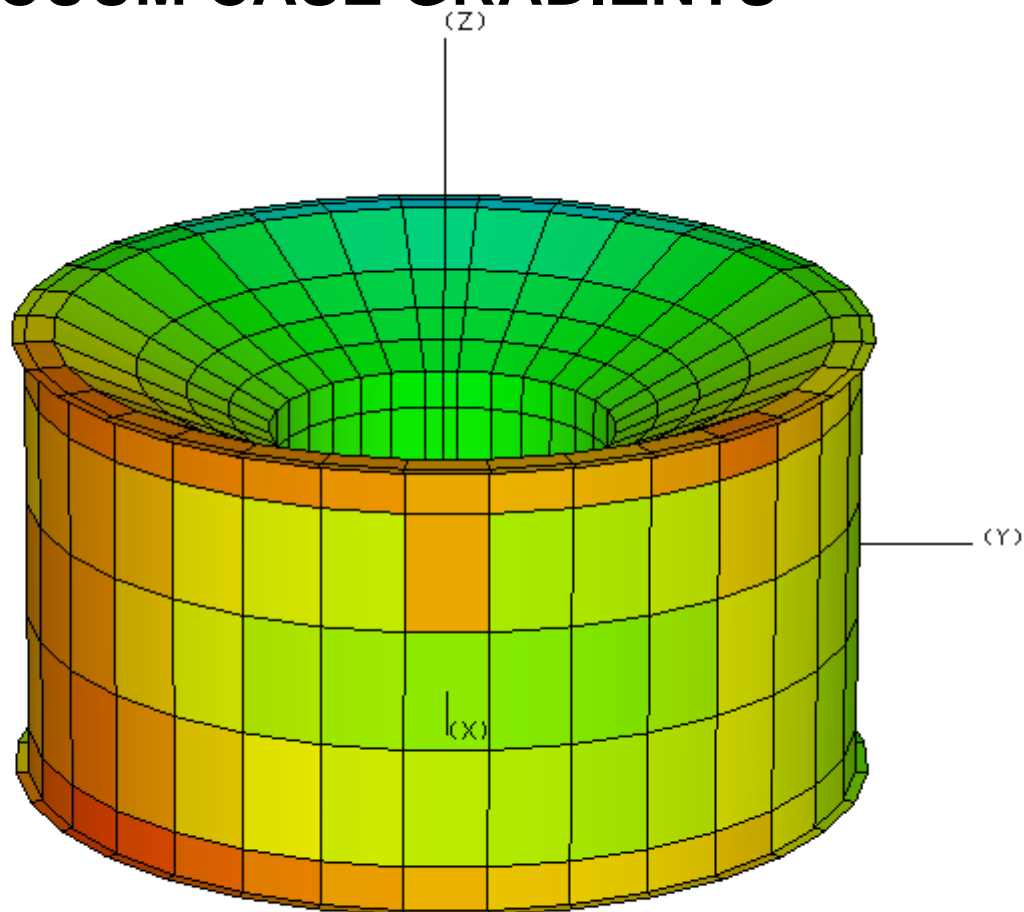
VACUUM CASE GRADIENTS

- Vacuum case temperature gradients have been considered in structural deflection analyses.
- Worst case gradients occur at $\beta = +75^\circ$, $YPR = -15^\circ, -20^\circ, -15^\circ$

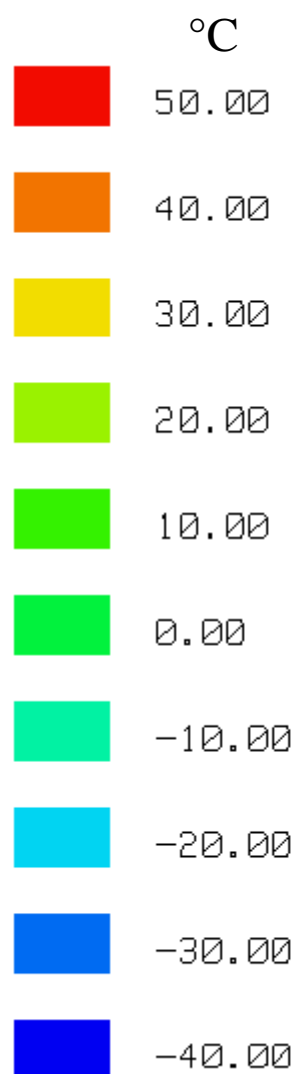
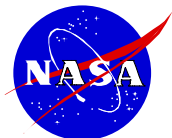




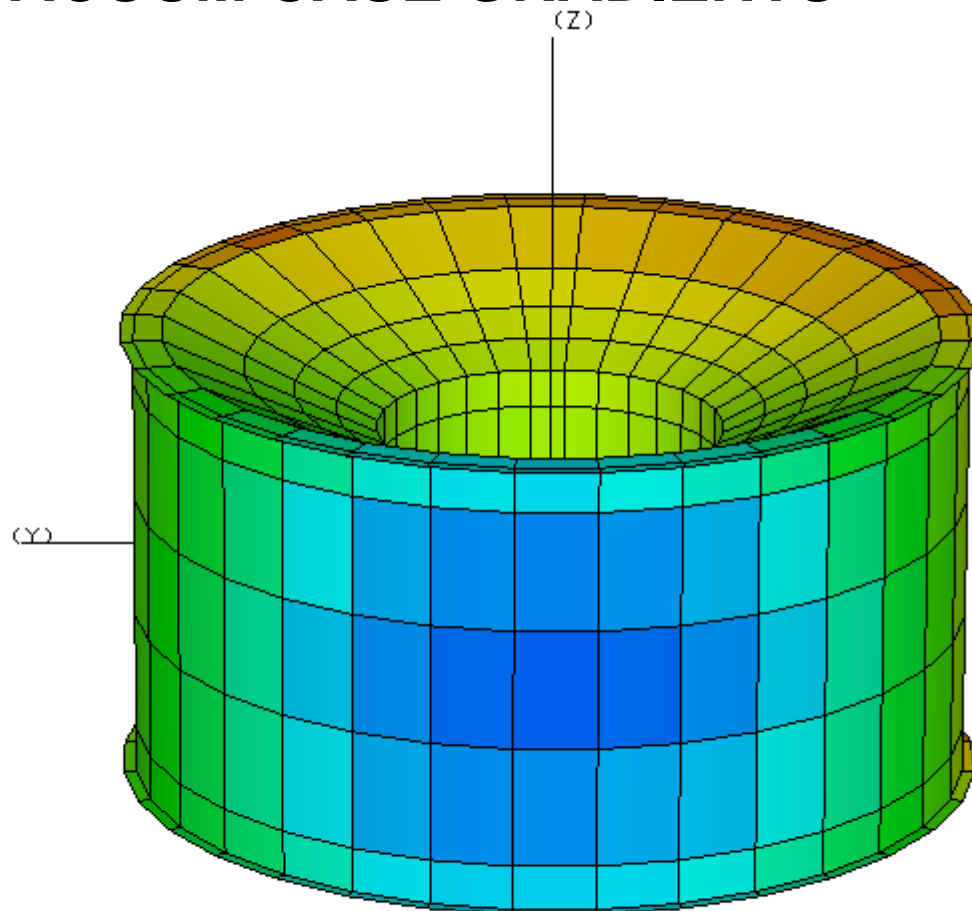
VACUUM CASE GRADIENTS



**Vacuum Case Maximum Delta T
B=+75, YPR=-15,-20,-15**



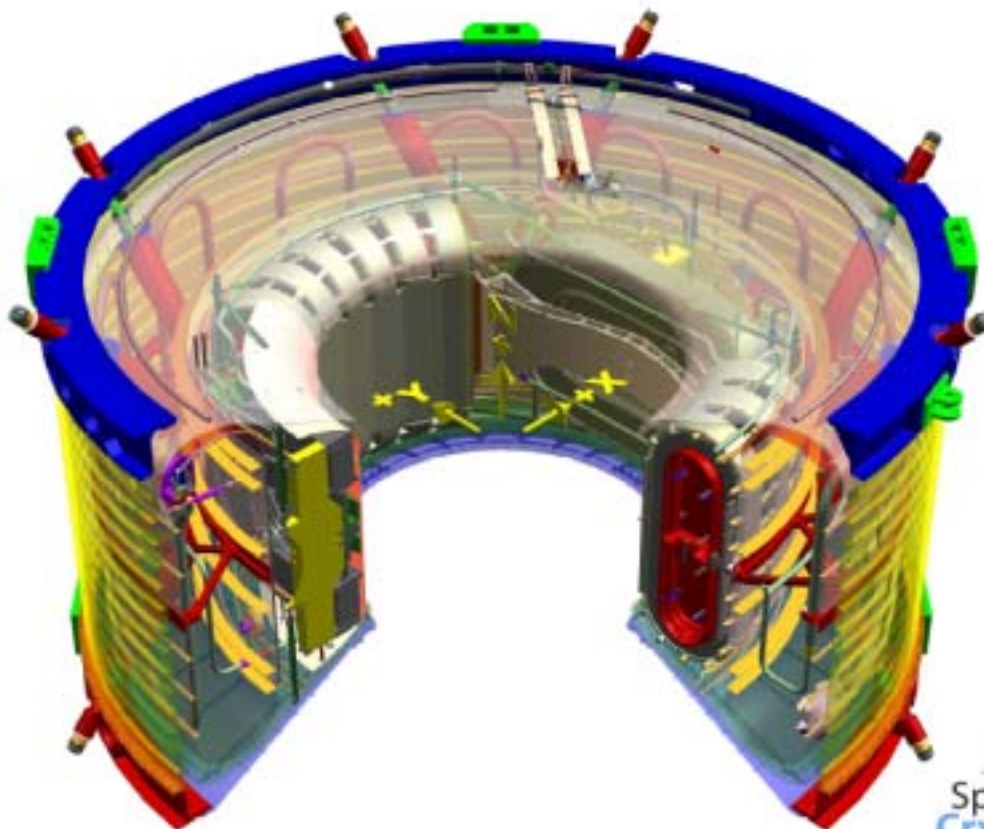
VACUUM CASE GRADIENTS



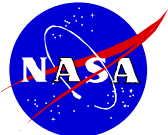
Vacuum Case Maximum Delta T
B=+75, YPR=-15,-20,-15

MAGNET

- By design magnet Cold Mass has minimal effect on VC temperature and is not included in thermal model. VC temperature, however, does play a significant role in heat leak into cold mass and therefore needs to be as cold as possible.



Space
Crymagnetics



Anti-Coincidence Counter (ACC)

- **Almost identical to what was flown on AMS-01**
- **Limits: -20°C to +40°C Operating and Non-Operating**
- **Small heat dissipation (~1 watt) in Photo Multiplier Tubes (PMT's) mounted on VC conical flange.**
- **ACC support shell coated with low emissivity surface to minimize radiation from Tracker support shell.**

